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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,042	12/07/2001	Poguang Wang	NU-500 XX	4399
207	7590	05/13/2004	EXAMINER	
WEINGARTEN, SCHURGIN, GAGNEBIN & LEOVICI LLP TEN POST OFFICE SQUARE BOSTON, MA 02109			PADGETT, MARIANNE L	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 05/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/009,042

Applicant(s)

WANG ET AL.

Examiner

Marianne L. Padgett

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/13/04 (8/11/03).
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-29 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Art Unit: 1762

1. Applicants' amendments have corrected the 112 problems discussed in section 1 of paper # 4, mailed 4/11/03. However, note that the independent claims 1 and 5 have the presence and the location of the "second chemical substance" as optional, both containing 2 options (a1 or 2). Unless one of the options is positively chosen all or both are still available to the process, even if a dependent claim further limits an option. The option labeled (a) (2) also has 2 alternatives. While the examiner guesses that the intent was for the second substance to necessarily be on the substrate, this is an option that is NEVER positively chosen, so the second substance, when it is positively chosen to release the electrons as for example in claims 3 or 4, can be any where, since it was NOT ever positively located on the substrate, i.e. it can be a gas and not on the substrate. Only the first chemical substance, when it is on the surface needs to be "non-gaseous".

In determining what the cryptic language of the claims means, reference to the definition of "work function" as given Lenrer et al., makes it clear that the claimed process CAN NOT be emitting an electron, since the energy used is defined to have insufficient energy to cause electron emission, unless energy is also added from some other unspecified and unclaimed source. It appears that the claims are directed to a photo (or thermally) induced chemical reaction between the substrate and the first or second substances, or between the 2 substances themselves, where an e^- transfer is involved in the reaction, i.e. the results included a negative ion (anion). It is also noted that when the latter is the case, the relationship of the surfaces' work function to the light energy is irrelevant, since the surface does not take part in the reaction.

It is further, that when no work function is provided for a material, the PTO can not measure it, and as shown by the table from the CRC Handbook, an individual element can have a wide range of work functions, presumably varying with microstructure or macrostructure and similar qualities of the material being measured.

Art Unit: 1762

2. The amendments that now positively require the first chemical substance to be deposited on the surface, before the light exposure step, remove Gruen from reading on the claims.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 5 & 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Cottrell et al (5,281,538), discussed in section 5 of paper #4, mailed 4/11/03.

Applicants assert that there is no implication of electron transfer in Cottrell, stating "Instead the one or more groups with an electron pair increase the ability of the compound to absorb the lower energy photons, which is the purpose of the Cottrell invention". The examiner failed to find support for applicant's interpretation of the mechanism by which Cottrell's matrix material interacts with the 337 nm light and their analyte. The examiner agrees that Cottrell does not explicitly say the matrix material

Art Unit: 1762

transfers electrons, however, they do teach (1) that their LDMS process produces ions by photon bombardment; (2) matrix material in which analytes are dispersed, may serve to transfer energy from photon to sample molecule, enhance the probability of desorption in the desired charge state, remove excess energy through desorbed clusters of sample and matrix ions (col.1, lines 5-24). Therefore, ions ARE created, with the "implications" of reactions between matrix and analyte involved in the creation of those ions.

Furthermore, concerning the matrix materials taught by Cottrell et al (col. 2, lines 1-24). They include various hydroxy-cinnamic acids, anthranilic acid (i.e. O-amino benzoic acid), etc, which are required to have "an aromatic ring substituted by one of more groups which possess an electron pair on the atom adjacent to the ring," which are represented by hydroxy, methoxy, and amino groups of matrix compounds taught by Cottrell, but applicant's own Ex. 1 (p.16) α -cyano-4- hydroxycinnamic acid fits the same criteria, is used with the same laser, to effect the same ionized desorption. Both the patent's and applicant's matrix compounds have electron pairs in electronegative groups that would have been expected to react equivalently under the like irradiation conditions, thus to transfer electrons to the analytes from the available electron pair. In other words, while Cottrell et al do not explicitly state the mechanism by which the laser desorption is occurring and lacking any evidence to the contrary, given materials with analogous groups with electron pair, the same wavelength (337 nm) from the same laser (N_2) would have inherently produced the same effect of transferring electrons from matrix material to analyte. Cottrell et al need not discuss the mechanism by which their reaction proceeds, in order for it to occur, and thus read on applicant's claims. Deciphering how a process already in use occurs mechanistically is not patently significant; one must do/have an unobvious different process.

5. Hackh's Chemical Dictionary, p.62 and 761 provide chemical formula and equivalent names for Cottrell et al's taught anthranilic acid and scopoletin.

Art Unit: 1762

6. Claims 2-4, 6-10, 16-17 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cottrell et al as applied to claims 1, 5 & 12-15 above, and further in view of Hutchens et al (5,719,060) or Koster (5,691,141) as applied in section 6 of paper #4, mailed 4/11/03.

As previously discussed in the 4/11/03 rejection, Cottrell et al did not specify any specific materials to be used as "targets", i.e. the equivalent of applicants' surface, but the secondary references of Hutchens et al or Koster teach metal generally, and specific ones claimed by applicant particularly. While these substrate materials would have been obvious for use for their known purpose in Cottrell et al's analogous process, where one would have been expected to use such conventional substrate materials for the sample, the above arguments for the inherency of use of the materials as claimed in a laser irradiation process as claimed to produce ionized desorption as claimed, would have inherently followed the same mechanism whether or not its discussed, unless applicants can show critically different step(s) or parameter(s) used to effect different mechanisms.

Also, it is noted that Cottrell et al use a mixture of matrix material, solvents with trifluoroacetic acid, plus the analyte to be deposited on their target (col. 2, lines 27-38). Analogously in applicant's example 1, they mix their cyano-hydroxy cinnamic acid with solvents, trifluoroacetic acid, plus analyte, hence the solution would have been expected to inherently form like complexes of the polyfluoro-containing groups with the analyte, with the acidic groups expected to supply components for salts or anions with the deposit of the solution on the target/surface.

7. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Dixon-Warren et al "Direct Evidence for Charge-Transfer Photodissociation at a Metal Surface: CCl₄/Ag(111)"

In Dixon-Warren et al, see the abstract and the title for phototreatment of materials as claimed to produces charge transfer as claimed. Note that the absorbate on the surface of the metal is in a non-gaseous state, thus reads on a possible meaning of applicant's "first chemical substance in a non-gaseous state is deposited onto a surface", which may require the results to be non-gaseous without requiring the

Art Unit: 1762

source material for deposit to be non-gaseous. Applicant's present phrasing may also exclude gaseous precursor, but does not necessitate that exclusion if the result are in the claimed state. Dixon-Warren's mechanism of charge transfer reads on the amended claims 1-2, and the last full paragraph on p. 2395 provides wavelengths and photon energies for various lasers employed, with the 4.0 or 3.5eV (308 or 350 nm) excimer lasers or YAG in the range of 4.1-5.0 eV (250-300 nm) providing laser light with energies below Ag work function values.

8. Art of interest includes Lopez et al (6,660,532 B1), who discusses layers where receptor molecules may undergo photoinduced charge transfer that binds analyte molecules to the receptor on the substrate (Abstract; Fig. 3: col. 4, lines 15-27; col. 5, lines 20-63+; col. 8, lines 35-50); and Polanyi et al (6,319,566 B1), who teach photoinduced patterning, that may cause absorbent molecules to react with underlying materials, including low work function materials, and reactions that involves electronic excitation. Neither of these references provides laser energies used in these processes.

9. Applicant's arguments filed 1/13/03 (8/11/03) and discusses above have been fully considered but they are not persuasive.

Applicant's arguments with respect to claims 1-2 have been considered but are moot in view of the new ground(s) of rejection.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 1762

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck, can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. L. Padgett/af
April 26, 2004
May 10, 2004



MARIANNE PADGETT
PRIMARY EXAMINER